RESPONSE UNDER 37 C.F.R. § 1.116
-- EXPEDITED PROCEDURE --
EXAMINING GROUP 2600

Our Docket No.: 42P28115

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Athanasios A. Kasapi	)	Examiner: Nguyen, Khai Minh
Application No.: 09/967,048	)	Art Group: 2617
Filed: September 28, 2001	)	
For: A System and Related Methods for Introducing Sub-Carrier Diversity in a Wideband Communication System	)	

RESPONSE AFTER FINAL

Mail Stop AF
Commissioner for Patents
P.O Box 1450
Alexandria, VA 22313-1450

OK TO ENTER: /K.N./

Sir:

In Response to the Final Office Action mailed November 22, 2010, Applicants respectfully request the Examiner to enter the following amendment and to consider the following remark.

CERTIFICATE OF EFS Web

I hereby certify that this correspondence is being submitted electronically via EFS Web on the date shown below to the United States Patent and Trademark Office.

Date of Deposit: January 14, 2011
Name of Person Mailing Correspondence: Debbie Casias
/Debbie Casias/ /January 14, 2011/
Signature Date

In the claims:

Following is a complete set of claims as amended with this Response.

1. (Currently Amended) A method comprising:

receiving information in the form of a data signal for transmission to a receiver;

storing the information in a memory;

splitting the data signal into a plurality of sub-carriers to at least partially redundantly transmit the information over a multi-carrier wireless communication channel using a splitter module;

splitting each of the sub-carriers into N signals one for each of a plurality of antenna paths, wherein each of the sub-carriers is to be transmitted over an array of N antennas using a different antenna path for each signal using a second splitter module; and

modifying each of the sub-carriers by a set of complex weights, the sets of complex weights having a complex weight for each antenna path, to ensure that each of the N signals of each sub-carrier of the wireless communication channel propagates along a different physical path to the receiver, wherein the set of complex weights used to modify each of the sub-carriers includes different weights for each antenna path of the array,

wherein the modifying is performed by control logic coupled to the memory, operable to access and process at least a subset of the information to implement diversity transmission.

2. (Previously Presented) A method according to claim 1, wherein each element of the set of complex weights scales one or more of a sub-carrier's amplitude and phase at an associated transmission antenna.

3. (Previously Presented) A method according to claim 1, further comprising developing a set of complex weights including:

choosing substantially different weights for each sub-carrier sharing information; and

iteratively repeating until all sub-carriers have been modified.

4. (Original) A method according to claim 3, wherein the substantially different weights are chosen to be orthogonal to the others.

5. (Original) A method according to claim 3, wherein developing a set of complex weights comprises:

selecting weight vector(s) to be applied to each of the sub-carriers from a pre-determined set of weight vectors.

6. (Previously Presented) A method according to claim 1, further comprising:

transmitting the modified sub-carriers.

7. (Currently Amended) A transceiver comprising:

a splitter module, operable to receive a data signal for transmission to a receiver, to split the data signal into a plurality of sub-carriers to at least partially redundantly transmit the information over a multi-carrier wireless communication channel and to split each of the sub-carriers into N signals one for each of a plurality of antenna paths, wherein each of the sub-carriers is to be transmitted over an array of N antennas using a different antenna path for each signal;

a diversity agent, operable to selectively apply a set of complex weight values to each of the sub-carriers, the sets of complex weights having a complex weight for each antenna path, to introduce spatial diversity between such sub-carriers;

a memory operable to store content;

control logic, coupled to the memory, operable to access and process at least a subset of the content to implement the diversity agent; and

a transmit module, coupled with the diversity agent, operable to receive the modified sub-carriers and transmit the signals to generate the multi-carrier communication channel with intra-channel spatial diversity, wherein each of the set of complex weight values include a plurality of weight values each associated with a different one of a plurality of antenna paths of an antenna array through which the sub-carriers are transmitted.

8. (Previously Presented) A transceiver according to claim 7, wherein the plurality of signals are baseband signals.

9. (Original) A transceiver according to claim 7, wherein the multi-carrier communication channel is comprised of a plurality of sub-carrier signals, each having a disparate set of complex weights introduced at a baseband of the sub-carriers to effect the spatial diversity between the sub-carriers.

10. (Cancelled)

11. (Previously Presented) A transceiver according to claim 7, wherein the transceiver is operable to develop the set of complex weight values for a given baseband signal to be maximally orthogonal complex weight values applied to another baseband signal.

12. (Previously Presented) A transceiver according to claim 7, wherein the transceiver is operable to develop a set of complex weight vectors for a sub-carrier that are substantially different from weight vectors modifying other sub-carriers that include at least a subset of information carried by the sub-carrier.

13. (Previously Presented) A transceiver according to claim 7, wherein the transmit module is operable to upconvert and amplify each of the modified baseband signals to generate a plurality of spatially diverse sub-carriers.

14. (Previously Presented) A transceiver according to claim 13, wherein the transmit module is operable to transmit each of the sub-carriers to one or more receiver(s).

15. (Canceled)

16. (Previously Presented) The method of claim 1, wherein the multi-carrier wireless communication channel uses Orthogonal Frequency Division Multiplexing (OFDM).

17. (Previously Presented) The transceiver of claim 7, wherein the multi-carrier communication channel uses Orthogonal Frequency Division Multiplexing (OFDM).

18. (Previously Presented) The transceiver of claim 7, wherein the transceiver is selected from a basestation and a wireless telephony subscriber unit.

19. (Previously Presented) The transceiver of claim 7, wherein the transceiver develops the set of complex weights to have inter-channel spatial diversity with respect to at least one communication channel of at least one other transceiver.

20. (Currently Amended) A subscriber unit comprising:

a splitter module, operable to receive a data signal for transmission to a receiver, to split the data signal into a plurality of sub-carriers to at least partially redundantly transmit the information over a multi-carrier wireless communication channel and to split each of the sub-carriers into N signals one for each of a plurality of antenna paths, wherein each of the sub-carriers is to be transmitted over an array of N antennas using a different antenna path for each signal;

a diversity agent, operable to selectively apply a vector of complex weight values to each of the plurality of sub-carriers to introduce spatial diversity between such sub-carriers, wherein the vectors of complex weight values applied to each signal includes a plurality of different complex weight values, and wherein each of the different complex weight values is operable to modify both an amplitude and a phase of a respective signal;

a memory operable to store content;

control logic, coupled to the memory, operable to access and process at least a subset of the content to implement the diversity agent; and

a transmit module, coupled with the diversity agent, operable to receive the modified sub-carriers and transmit the signals through the antenna paths to generate the multi-carrier communication channel with intra-channel spatial diversity.

21. (Previously Presented) A transceiver according to claim 7, wherein each of the set of complex weight values are comprised of a plurality of weight values each associated with one of a plurality of antennae of an antenna array through which the sub-carriers are transmitted.

22. (Currently Amended) A device comprising:

a splitter module, operable to receive a data signal for transmission to a receiver, to split the data signal into a plurality of sub-carriers to at least partially redundantly transmit the information over a multi-carrier wireless communication channel and to split each of the sub-carriers into N signals one for each of a plurality of antenna paths, wherein each of the sub-carriers is to be transmitted over an array of N antennas using a different antenna path for each signal;

a diversity agent, operable to selectively apply a vector of complex weight values to each of the plurality of sub-carriers to introduce spatial diversity between such sub-carriers, wherein the vector of complex weight values applied to each signal includes a plurality of different complex weight values, and wherein each of the different complex weight values is operable to modify both an amplitude and a phase of a respective signal;

a memory operable to store content;

control logic, coupled to the memory, operable to access and process at least a subset of the content to implement the diversity agent; and

a transmit module, coupled with the diversity agent, operable to receive the modified sub-carriers and transmit the signals through the antenna paths to generate the multi-carrier communication channel with intra-channel spatial diversity.

Remark

Applicants respectfully request reconsideration of this application as amended. Claims 1, 7, 20 and 22 have been amended. Claims 10 and 15 have been canceled. Therefore, claims 1-9, 11-14 and 16-22 are now presented for examination.

Allowable Subject Matter

Claim 15 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claim 1 has been amended to incorporate the limitations of Claim 7 which is believed to be allowable therefor, *inter alia.* The remaining independent claims are also similarly amended and believed to be allowable on the same grounds, *inter alia.*

Conclusion

Applicants respectfully submit that the rejections have been overcome by the amendment and remark, and that the claims as amended are now in condition for allowance. Accordingly, Applicants respectfully request the rejections be withdrawn and the claims as amended be allowed.

Invitation for a Telephone Interview

The Examiner is requested to call the undersigned at (303) 740-1980 if there remains any issue with allowance of the case.

Request for an Extension of Time

Applicants respectfully petition for an extension of time to respond to the outstanding Office Action pursuant to 37 C.F.R. § 1.136(a) should one be necessary. Please charge our Deposit Account No. 02-2666 to cover the necessary fee under 37 C.F.R. § 1.17(a) for such an extension.

Charge our Deposit Account

Please charge any shortage to our Deposit Account No. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Date: January 14, 2011

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